Laboratory characterization of thin silicon sensors for proton beam therapy

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Purpose: Laboratory characterization of thin strip silicon sensors with internal gain (Ultra Fast Silicon Detectors), developed for beam monitoring applications in particle therapy, has been performed in order to qualify each sensor in terms of leakage current, dead and noisy channels and gain as a function of the bias voltage.

Methods: 130 detectors with two different geometries and different doses of carbon or gallium dopant were tested with a IV-CV analyzer and using a laser source. Several performance parameters were extracted from IV and CV curves.

Results: Measurements showed that boron doped sensors perform better than gallium ones.